Indiana Department of Education
SUPPORTING STUDENT SUCCESS

ISTEP+: Algebra I

End-of-Course Assessment

Released Items and Scoring Notes

Introduction

Indiana students enrolled in Algebra I participated in the *ISTEP+: Algebra I Graduation Examination* End-of-Course Assessment (ECA) during the 2012-2013 test administration windows. The Algebra I ECA consists of four item types which contribute to a student's scale score: multiple-choice, constructed-response, gridded-response and graphing items. It is important to keep in mind that a significant portion of a student's score is calculated from the multiple-choice items on the assessment, which are not addressed within this document.

This document consists of constructed-response and graphing items from the Spring 2013 administration and includes:

- Sample released open-ended questions
- Rubrics used by trained evaluators to score student responses
- Sample papers used by trained evaluators to distinguish between rubric score point values
- Annotations describing the rationale for scoring student responses

The purpose of this guide is to provide additional Algebra I ECA sample items and to model the types of items that are scored using rubrics.

Reporting Category 1: Solving Linear Equations and Inequalities

Question 1

Last year, the area of Jamie's garden was 32 square feet. This year, she added a new rectangular-shaped section to her garden. The length of the new section of the garden is 12 feet. The TOTAL area of her garden now, last year's garden plus the new section, is 116 square feet.

Write an equation that can be used to determine the width (*w*), in feet, of the new section of the garden.

Answer_____

What is the width, in feet, of the new section of the garden?

Answer_____

Exemplary Response:

- $32 + 12w = 116$

Or other equivalent equation

And

- 7 (feet)

Rubric:

2 points: Exemplary response. Correct equation in Part A and correct solution in Part B.
1 point: Correct equation in Part A or correct solution in Part B. Or, correct solution in Part B based on an incorrect linear equation in Part A, given that one of the two necessary steps to solve the problem are done correctly.
0 points: Other

Question 1, Sample A – 2 points

Part A: 84 = 12*x*
Part B: 7 feet

Notes: This response is equivalent to the exemplary response.

Question 1, Sample B – 1 point

Part A: (116 – 32)/12 = W
Part B: 6.5 feet

Notes: The response for Part A is correct; however, the response for Part B is incorrect.

Question 1, Sample C – 1 point

Part A: (32) (12x) = 116
Part B: w = 7ft

Notes: The response for Part B is correct; however, the response for Part A is incorrect.

Question 1, Sample D – 0 points

Part A: 32 x 12 = w
Part B: 464ft

Notes: Part A and B are both incorrect.

Reporting Category 3: Systems of Linear Equations and Inequalities

Question 2

In the fall, a community service club sold 10 shirts and 20 hats for a total of $490. In the spring, the club sold 20 shirts and 30 hats for a total of $860.

Each shirt sold for the same price. Each hat sold for the same price.

Write a system of equations that can be used to find the cost, in dollars, of one shirt (s) and one hat (h).

Answer_____

What is the total cost, in dollars, of one shirt and one hat?

Answer_____

Exemplary Response:

- $10s + 20h = 490$
  $20s + 30h = 860$

  Or other equivalent system of equations

And

- $37.00

  Note: Student receives full credit if response given indicates separately that one shirt costs $25.00 and one hat costs $12.00.

Rubric:

2 points: Exemplary response. Correct system given in Part A and correct value given in Part B.
1 point: One key element. Correct system of equations only. Or, correct value in Part B only. Or, a correct answer in Part B based on an incorrect system of equations given in Part A.
0 points: Other

Question 2, Sample A – 2 points

Part A: 10s + 20h = 490; 20s + 30h = 860
Part B: $37

Notes: This response is equivalent to the exemplary response.

Question 2, Sample B – 1 point

Part A: 10s + 20h = 490; 20s + 30h = 860
Part B: h = 12 and s = 37

Notes: The response for Part A is correct; however, the solution in Part B is incorrect.

Question 2, Sample C – 1 point

Part A: 10s + 20h = 490
Part B: s = 25 and h = 12

Notes: The response for Part B is correct; however, Part A only gives one of the two correct equations.

Question 2, Sample D – 0 points

Part A: 10x + 30x = 860
Part B: $17.50

Notes: Part A and B are both incorrect.

Reporting Category 2: Graphing and Interpreting Linear and Non-Linear Relations

Question 3

A line passes through the points (4, -7) and (-5, 8).

What is the slope of this line?

Answer_____

Write an equation that represents this line.

Answer_____

Exemplary Response:

- $m = -\frac{5}{3}$

And

- $y = -\frac{5}{3}x - \frac{1}{3}$

Or other equivalent equation

Rubric:

2 points: Exemplary response. Correct slope and correct equation.
1 point: Correct slope or correct equation. Or, correct equation based on an incorrect slope.
0 points: Other

Question 3, Sample A – 2 points

Part A: $m = -5/3$
Part B: $y = -5/3\,x - 1/3$

Notes: This response is equivalent to the exemplary response.

Question 3, Sample B – 1 point

Part A: $-5/3$
Part B: $y = -5/3\,x + 41/3$

Notes: The response for Part A is correct; however, the response for Part B is incorrect.

Question 3, Sample C – 1 point

Part A: 0.5
Part B: $y = 0.5x - 9$

Notes: The response for Part A is incorrect; however, the response for Part B gives a correct equation based on the incorrect slope in Part A.

Question 3, Sample D – 0 points

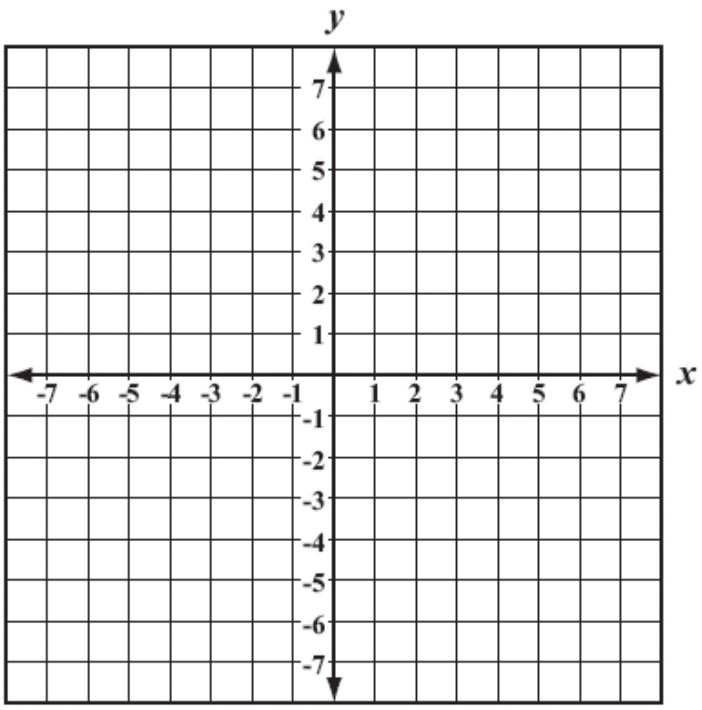
Part A: $m = 9$
Part B: $y = 9x - 15$

Notes: Part A and B are both incorrect.

Reporting Category 2: Graphing and Interpreting Linear and Non-Linear Relations

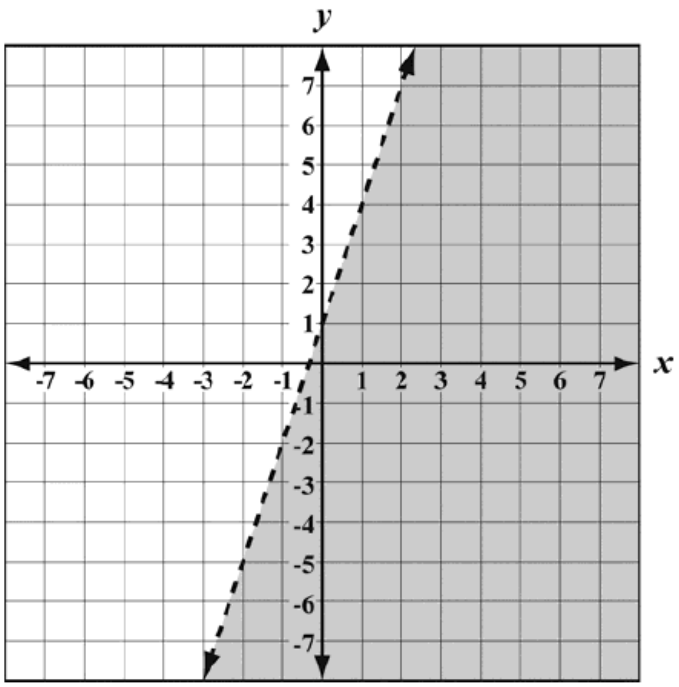
Question 4

Graph: $y < 3x + 1$



Exemplary Response:

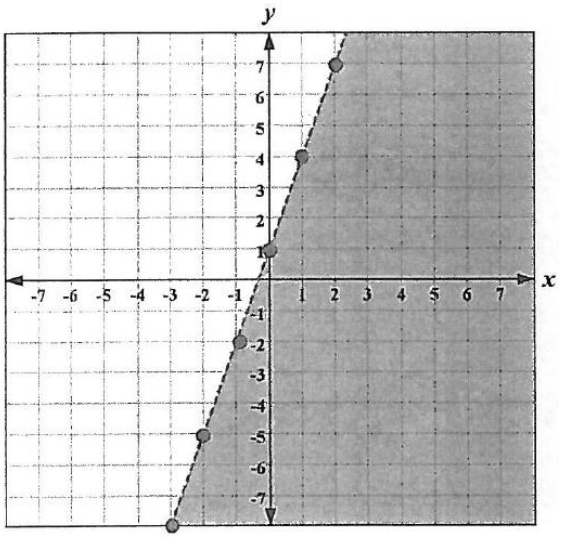
- The graph of $y < 3x + 1$.



Rubric:

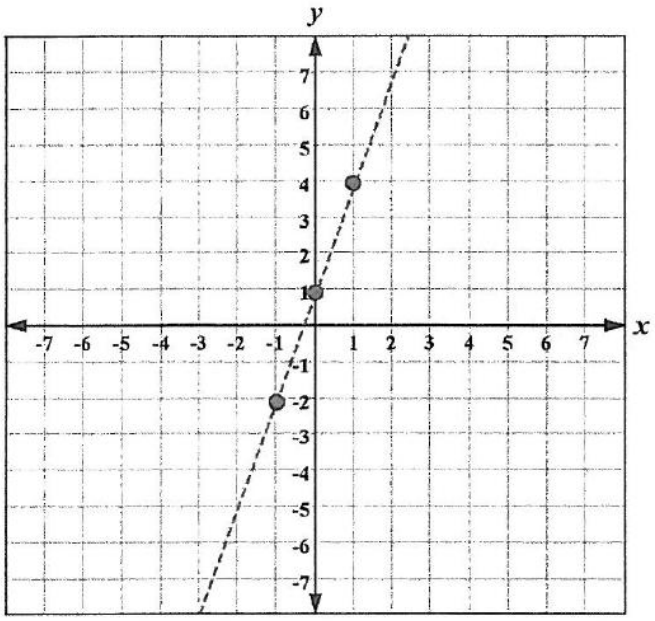
2 points: Exemplary response.
1 point: The graph of $y = 3x + 1$ using a solid or dashed line with incorrect or no shading. Or, an incorrect dashed line shaded correctly. Note: if more than 1 line is graphed or additional incorrect points are potted, no points will be awarded.
0 points: Other

Question 4, Sample A – 2 points



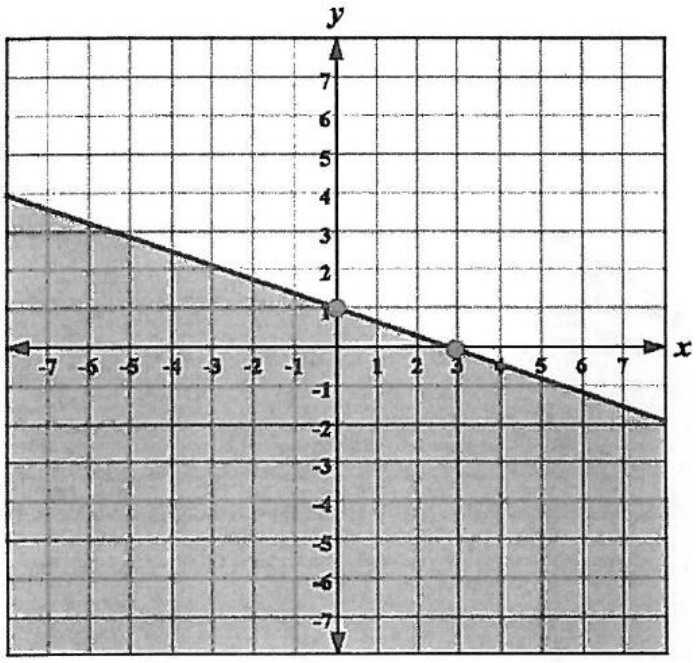
Notes: This response is equivalent to the exemplary response.

Question 4, Sample B – 1 point



Notes: This response shows the graph of $y = 3x + 1$ using a dashed line; however, the proper region is not shaded.

Question 4, Sample C – 0 points



Notes: This response is incorrect and receives a score of zero points.

Reporting Category 1: Solving Linear Equations and Inequalities

Question 5

Ben tried to solve the inequality $6x - 1 > 4 + 3(x - 2)$. He made an error. His work is shown below.

$$6x - 1 > 4 + 3(x - 2)$$
$$6x - 1 > 4 + 3x - 6$$
$$6x - 1 > 3x - 2$$
$$3x - 1 > -2$$
$$3x > -1$$
$$x < -\frac{1}{3}$$

What error did Ben make?

_____

_____

Solve: $6x - 1 > 4 + 3(x - 2)$

Answer_____

Exemplary Response:

- He flipped the inequality symbol. Or, he should not have flipped the inequality symbol.

  Or other acceptable description of the error. Note: response may reference what was done incorrectly or what should have been done correctly.

And

- $x > -\frac{1}{3}$

Rubric:

2 points: Exemplary response. Correct description in Part A and correct solution in Part B.
1 point: Correct description in Part A or correct solution in Part B.
0 points: Other

Question 5, Sample A – 2 points

Part A: His inequality sign is going the wrong way in the last line of his work.
Part B: $x > -1/3$

Notes: This response is equivalent to the exemplary response.

Question 5, Sample B – 1 point

Part A: He changed the inequality from > to this < when he should have kept it the same.
Part B: $x = 1$

Notes: Part A provides a valid response; however, Part B is incorrect.

Question 5, Sample C – 0 points

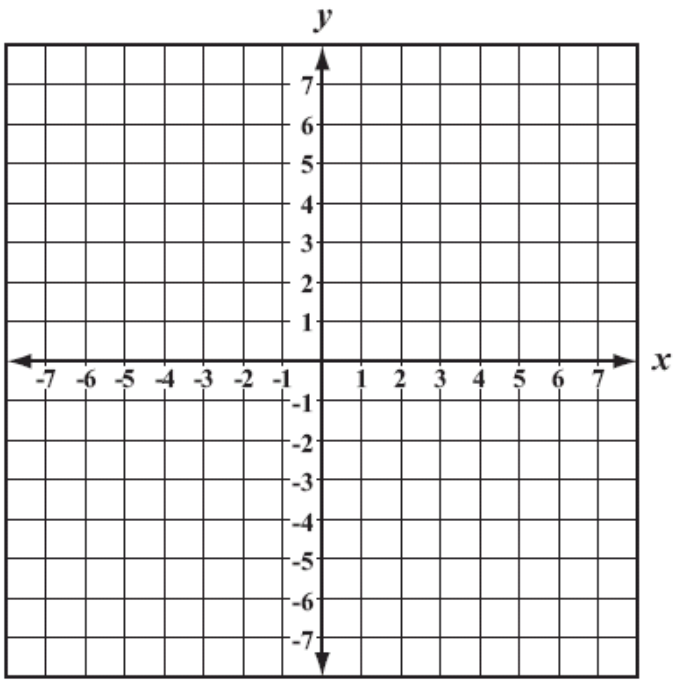
Part A: he needs to do 4 + - 6
Part B: $x > -1.3$

Notes: Part A and B are both incorrect.

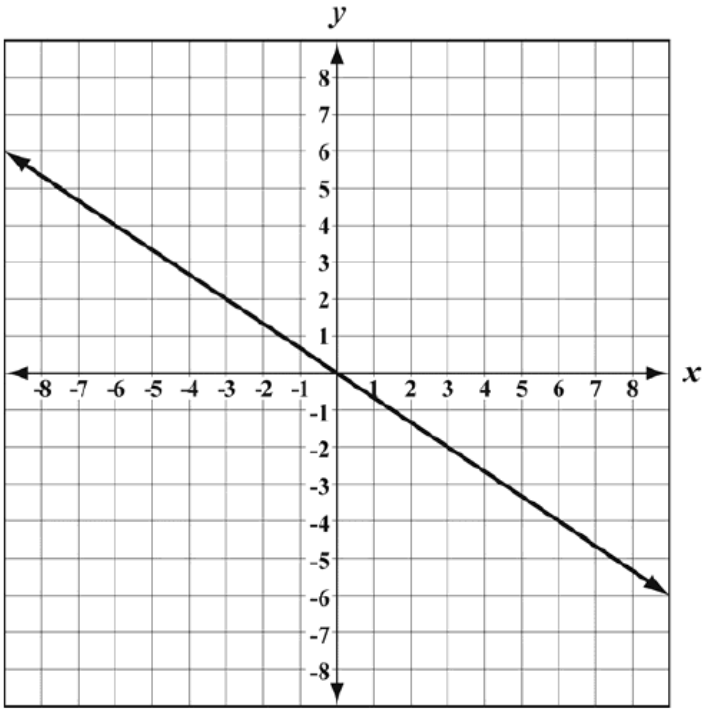
Reporting Category 2: Graphing and Interpreting Linear and Non-Linear Relations

Question 6

Graph: $y = -\frac{2}{3}x$



Exemplary Response:

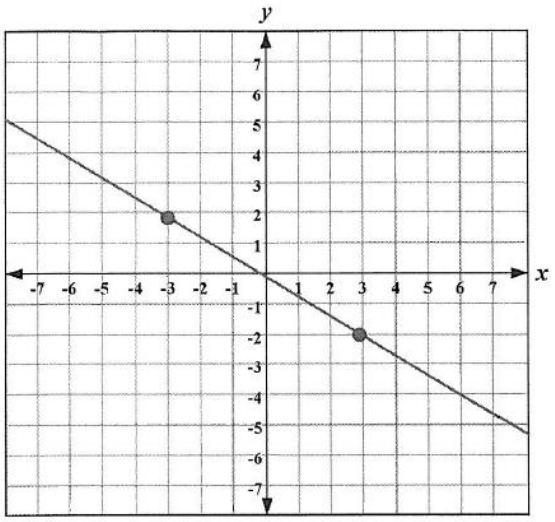


Rubric:

1 point: Exemplary response.
0 points: Other

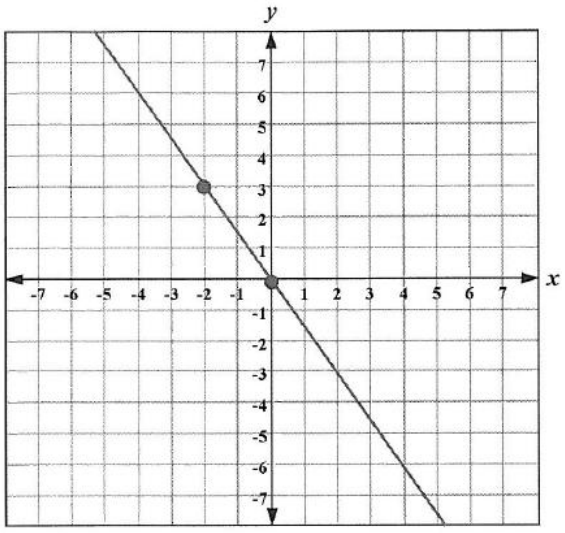
Note: If more than one line is graphed, or additional incorrect points are plotted, no points will be awarded.

Question 6, Sample A – 1 point



Notes: This response is equivalent to the exemplary response.

Question 6, Sample B – 0 points



Notes: This response is incorrect.

Reporting Category 5: Solving and Graphing Quadratic Equations

Question 7

Solve for x: $3x^2 - 8x + 4 = 0$

Answer_____

Exemplary Response:

- $x = \frac{2}{3}$ and $x = 2$

Rubric:

2 points: Exemplary response. Two correct solutions.
1 point: One correct solution. Or, solutions of $x = -\frac{2}{3}$ and -2. Or, an answer left unsimplified, such as, $x = \frac{8 \pm \sqrt{16}}{6}$.
0 points: Other

Question 7, Sample A – 2 points

Answer: x = 2 and x = 2/3

Notes: This response is equivalent to the exemplary response.

Question 7, Sample B – 1 point

Answer: 16, 2

Notes: This response gives one correct solution.

Question 7, Sample C – 0 points

Answer: 2x

Notes: This response is incorrect.

Reporting Category 3: Systems of Linear Equations and Inequalities

Question 8

Solve the system of equations below.

$$y = -4x + 14.5$$
$$2x + 2y = 11$$

Answer_____

Exemplary Response:

- (3, 2.5)

Rubric:

2 points: Exemplary response. Correct values for both x and y.
1 point: One correct value. Or, correct values switched. Or a correct *x*-value based on an incorrect *y*-value. Or, a correct *y*-value based on an incorrect *x*-value.
0 points: Other

Question 8, Sample A – 2 points

Answer: x = 3, y = 5/2

Notes: This response is equivalent to the exemplary response.

Question 8, Sample B – 1 point

Answer: x =4, y = 2.5

Notes: This response shows the correct y-value of the system of equations; however, the x-value is incorrect.

Question 8, Sample C – 1 point

Answer: x = -3, y = 8.5

Notes: This response gives a correct y-value based on an incorrect x-value using the equation 2x + 2y = 11.

Question 8, Sample D – 0 points

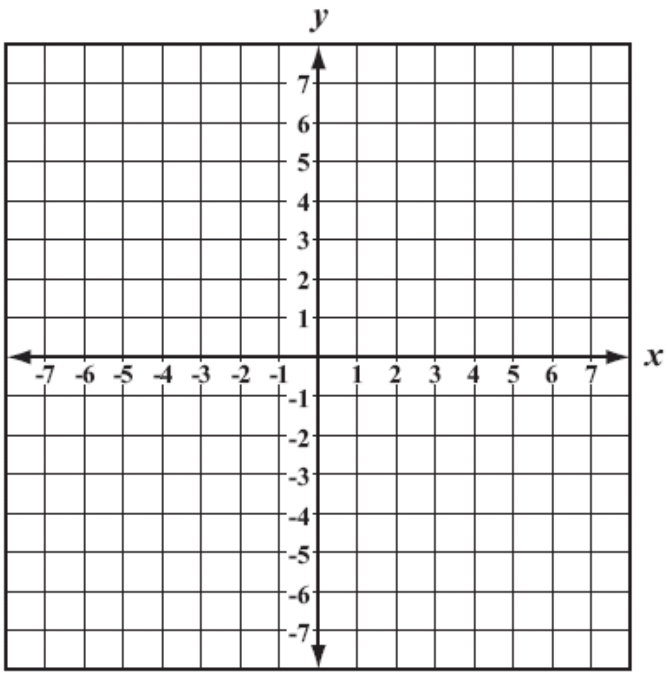
Answer: (-2,2)

Notes: This response is incorrect.

Reporting Category 2: Graphing and Interpreting Linear and Non-Linear Relations

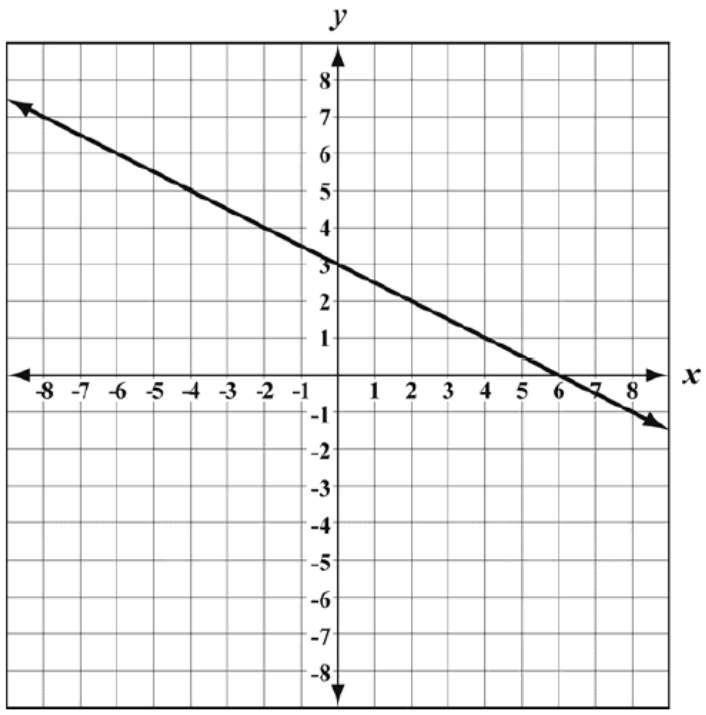
Question 9

Graph: $4y = -2x + 12$



Exemplary Response:

- The graph of $4y = -2x + 12$.

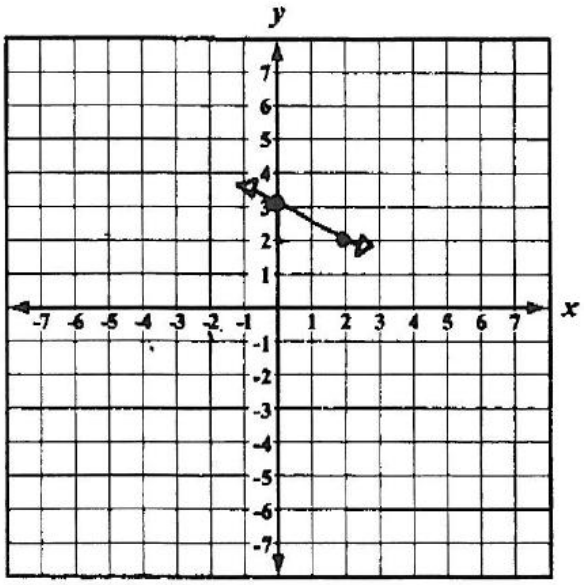


Rubric:

1 point: Exemplary response.
0 points: Other

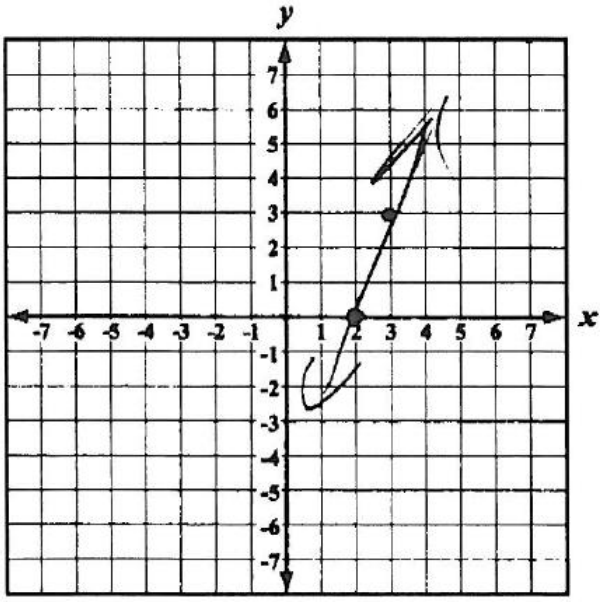
Note: If more than one line is graphed, or additional incorrect points are plotted, no points will be awarded.

Question 9, Sample A – 1 point



Notes: This response is equivalent to the exemplary response.

Question 9, Sample B – 0 points



Notes: This response is incorrect.